Replacement of a Legacy LIMS with SQL*LIMS in an Environmental Monitoring Lab - Project Review

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Topics

I. Overview of the Lab Processes
- **A. History and background**
- **B. How samples are scheduled**
- **C. Analyses and instruments**
- **D. Reports**

II. Description of the Legacy LIMS

III. Management Approach

IV. Technical Innovations
- **A. Scheduler Interface**
- **B. Re-use of instrument interfaces**
- **C. Reporting Database**

V. Current Status

Timeline of Environmental Sampling at SRS

1951-53 Baseline sampling. 6600 samples processed.

1953 First reactor goes critical.

1954 Environmental and bioassay lab building (735-A) completed.

1980s Water quality lab (735-11A) is built.

1987 Development begins on legacy LIMS, EMCAP (EMCAP=Environmental Monitoring Computer Automation Program)

1990 EMCAP goes into production.

2001-2002 Environmental and bioassay operations move to new Regulatory Monitoring and Bioassay Lab building

Environmental Sample Types

- **Effluent (Outfalls from facilities)**
- **Groundwater wells**
- **Rivers and streams**
- **Rainwater**
- **Soil**
- **Stationary Thermo Luminescent Detectors**
- **Stack filters**
- **Biota (Milk, Fish, Deer, Plants, …)**
- **Radiological screening of samples sent to offsite labs.**
- **Annual Sample Load:**
  - **120,000 radiochemical determinations**
  - **25,000 water quality determinations**

Sample Collection Scheduling

- For routine samples, the frequency, location, reason, and analysis regimen are input months in advance.
- Sample labels are generated prior to sample collection.
- Barcode on labels is used to login samples.
- Non-routine samples are scheduled as needed or logged in when received.
- Non-routine samples have increased in recent years due to facility shutdowns and cleanup projects.

Radiological Instruments

Canberra Genie Gamma Spec (K40, Co60, I129, Cs137, …)

Canberra Alpha Analyst (Am241, Cm244, Pu, U, …)

Packard TriCarb 2500TR LSC (H3, Total Activity, C14)

EG&G CountMaster GFPC

Oxford Tennelec LB5100 GFPC (Gross alpha/beta, Sr)

replaced by

Tennelec LB4110 GFPC

REPORTS

Operational

- **Prep Status (Status, location of samples)**
- **Reruns by analyst, lab**
- **Turnaround time**
- **Sample completion (whether subsamples are done)**
- **Sample disposal**
- **Technician qualification**

Customer

- **AN98 (Electronic data deliverable)**
- **Trending by sample location**
- **Dosage reports integrating various sample matrices**
- **Site Annual Environmental Report**

Description of the Legacy System - EMCAP

- **Operating System: VMS 6.2**
- **Database: Ingres 6.4**
- **SAS Statistical Reporting Package**
- **Custom contractor-written code**
- **Languages: FORTRAN and C with embedded SQL, DCL**
- **Contains 14 years worth of environmental data.**

Why Replace Old EMCAP?

- **EMCAP could not handle anticipated increase in the sample load.**
- **VAX system, Ingres database no longer supported.**
- **VMS, Ingres, and custom-made LIMS violate site standards and industry trends.**
- **EMCAP was hard to maintain.**
- **EMCAP didn’t have QC data.**

Management Approach

- **Requirement specifications written in week long “lock-in”**
- **Schedule accelerated by identifying pieces that could wait until after initial installation.**
- **Team made up from several organizations.**
  - **8 - Lab Process Systems (LIMS people)**
  - **3 - Other Process Control**
  - **2 - Information Technology**
  - **1 - Savannah River National Lab**
  - **1 - Pool of unfunded employees**
- **Replicated vendor training in house.**
- **Mentor responsibilities formally established.**
- **Project Manager from Project Design & Construction Business Unit**
- **Schedule gains were applied to the test phase.**
- **Database of testing defects.**

Technical Innovations - Scheduler Interface

- The existing EMCAP scheduler was retained because of its unique capabilities. Output from the scheduler is transmitted to SQL*LIMS. Scheduled samples are automatically logged in.
- Sample plans were reduced from approximately 1500 to 100

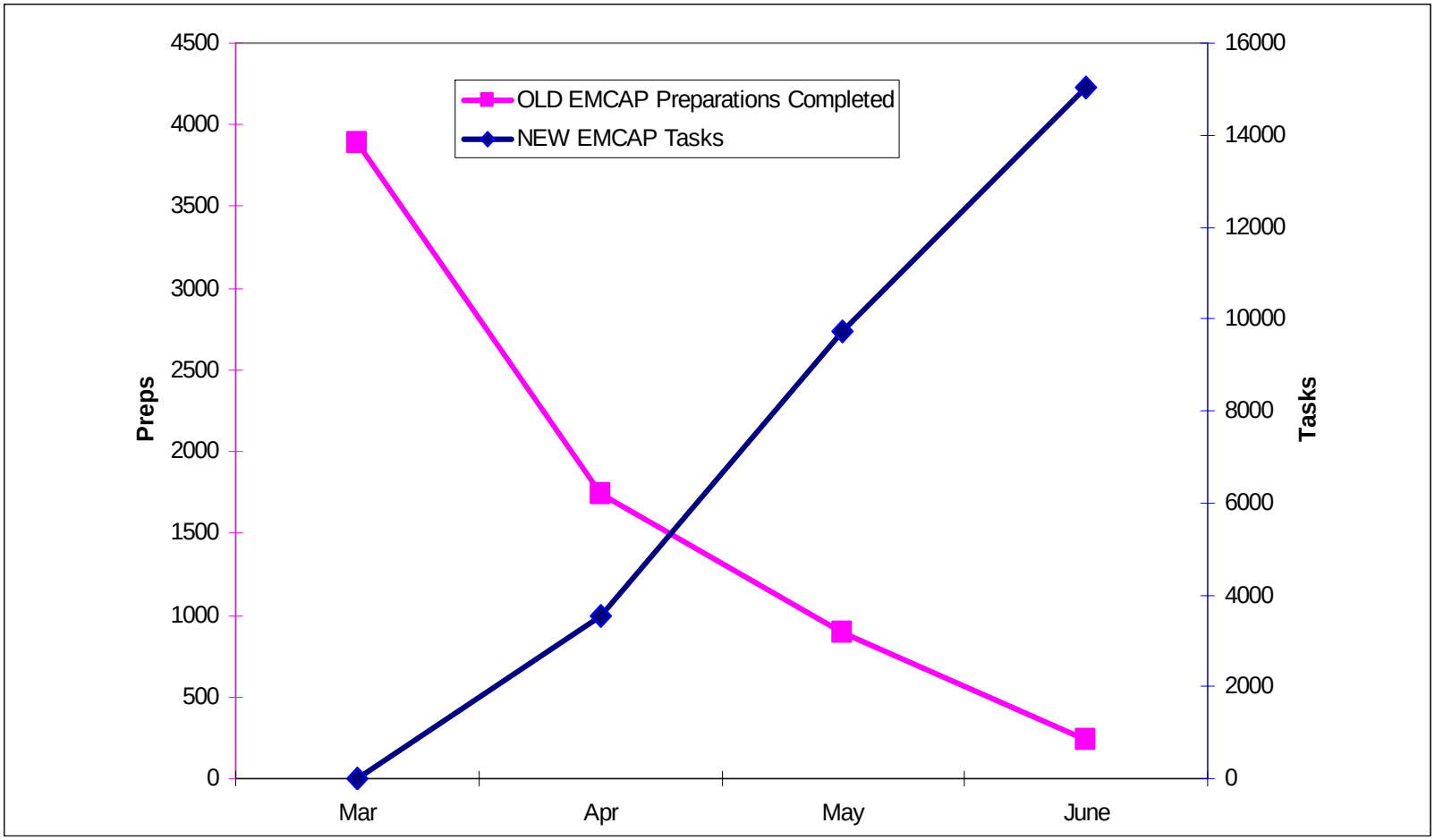
Technical Innovations – Instrument Interface Re-use

- Instrument interface software had been developed which processed old EMCAP data through SQL*LIMS. This software was re-used on the project.

Technical Innovations – Reporting Database

- Allowed old EMCAP data to be used with the new system for historical checks
- Minimal change in reporting tools
- Maintained separation between lab and customers.
- Will ease integration of years of EMCAP data with current results.

Sample Load Shifted From EMCAP to SQL*LIMS During Spring 2005



Conclusion

$ 1.7 million project using 16 programmers was completed on time and under budget and will save the customer an estimated $800,000 in FY05 and $2.4 million per year thereafter.